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AUTHOR Della-Piana, Connie Kubo; Della-Piana, Gabriel M.
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ABSTRACT

Part of a larger line of inquiry on the socially constructed experience of the mediated classroom and student socialization in the university community, a study reports on the development of an instrument for tapping student experience in televised instruction classrooms. A theoretical framework underlies the instrument to illuminate reasons for student judgments about the positive and negative learning experiences in the class. Items are structured so that the reasons include expressions of personal responsibility for success or shortfalls as well as attributions of responsibility to external conditions. Findings based on using the instrument in a physics course (in which teaching assistants interact with students off campus before and after rebroadcasts of the videotaped lectures) show how the item format contributes to understanding why students make the evaluative judgments that they do and these are drawn upon to illuminate three issues relevant to instructionally appropriate evaluation: effectiveness/quality; commitment/stakeholders; and access/resources. (Contains 13 references and a note). (RS)

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Title: Findings in Search of Issues: Preliminary Development of a Student Questionnaire for Distance Education Contexts.

Authors: Connie Kubo Della-Piana
Assistant Professor
Department of Communication
University of Texas at El Paso
El Paso, TX 79968

Gabriel M. Della-Piana
Director of Evaluation
El Paso Collaborative for Academic Excellence
University of Texas at El Paso
El Paso, TX 79968

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Abstract

Title: Findings in Search of Issues: Preliminary Development of Student Questionnaire for Distance Education Contexts.

This is a report of work within a larger line of inquiry by the senior author on the socially constructed experience of the mediated classroom and student socialization in the university community. The present study reports on the development of an instrument for tapping student experience in televised instruction classrooms. A theoretical framework underlies the instrument to illuminate reasons for student judments about the positive and negative learning experiences in the class. Items are structured so that reasons include expressions of personal responsibility for success or shortfalls as well as attributions of responsibility to external conditions.

Findings are presented to show how the item format contributes to understanding why students make the evaluative judgments that they do and they are drawn upon to illuminate three issues relevant to instructionally appropriate evaluation: effectiveness/quality, commitment/stakeholders, and access/resources.

Findings in Search of Issues: Preliminary Development of a Student Questionnaire for Distance Education Contexts

This report has three purposes. First we will describe the early stages of development of a student questionnaire for distance education including: preassessment, conceptualization, and development and tryout of a pilot instrument. Second, we will report on the findings of a preliminary tryout of the questionnaire with emphasis on a high school physics class. The findings will be presented in a way that helps one to see how the framework underlying the item format contributes to producing information that helps one to understand why students responded as they did in their evaluations of the course. Finally, we will illuminate issues derived from the study--issues that may be helpful in guiding the design of instructionally appropriate evaluation.

The general approach taken is that of "service delivery assessment" (Henricks, 1981). Our instrument development is theory-driven because of the need to represent the complexity of media delivery contexts in an interpretable form (Rice, 1984)[1]. The focus is on gathering formative data to guide development (Johnston, 1984). Our concern for "information use" leads to building into data gathering and portrayal a structure for getting user attention and understanding (Della-Piana & Della-Piana, 1984; Della-Piana, 1989). Finally, concerns about equity in tight funding situations (Baird & Monson, 1992; Duning, VanKekerix, & Zaborowski, 1993) have influenced the issues we

draw from our findings. It is important to note that the present study represents one methodological and theoretical approach of the authors. Broader perspectives for studying the socially constructed experience of the mediated classroom and of student socialization in the academic community are being explored by the senior author.

Preassessment

Preassessment work involved finding out what is currently going on in the local context of distance education, coming to a consensus on preliminary issues or concerns, and formalizing a contractual agreement between the assessment staff and the contracting agency.

A picture of what was currently going on was obtained from documents (Requests for Proposals for evaluation of distance education coming out of a State Office of Education and brochures and reports describing current services) and from discussions with staff members in the current delivery system. The RFPs and the funded studies were for one-shot or year-by-year work with a focus on short terms "productivity" goals. Distance education capabilities were broad as described by available documents. The current systems allow interactive (two-way) audio and video and telephone call-in mediated by statewide broadcast TV, closed circuit line of site, and microwave technologies. The evaluative concerns of the administration responsible for distance learning service delivery were to inform potential users of the services as to how the instruction works, to inform users as to the

conditions under which it works best, and to provide the central administration and legislature with information on how it works and its "cost effectiveness".

There were two preliminary issues or concerns on which a consensus was reached between the administrators and evaluators. First, to explore the "why" of the outcomes. The search was for how media are used that makes the difference in effectiveness. This moves beyond an emphasis on outcome alone and toward developing ways of finding out how a program works. Second, to explore how information gets used. That is, how do you present information to decision makers so that it contributes to understanding rather than presume to dictate a particular choice. A contractual agreement was reached based on this background including: the charge to the evaluators, the audience for the report, the resources available, the format of reporting, access to data, procedures of the study, preliminary or foreshadowed issues, dissemination plans, and consequences of either party violating the agreement. Due to limited funding and a joint interest in the work the current contract was kept informal.

Conceptualization of the Instrument

The conceptualization stage of development included formulating an organizing framework for the evaluation instrument and modifying or fleshing it out with information drawn from the results of previously administered questionnaires in a similar local context. What we wanted was a framework for the questionnaire that would remind us of the many possible reasons

why a student may perform well in a particular distance learning context and why there may be shortfalls in accomplishment. Cognitive theory in social contexts of learning led us to four classes of variables:

1) Characteristics the student brings into the learning situation. This encompasses background knowledge of the content or structure of the subject matter; plans and strategies available for specific kinds of learning and learning contexts; the will to learn; confidence in one's abilities and expectations concerning one's learning; and typical responses to perceived success or failure.

2) Learning task, tools, and information retrieval conditions. This encompasses performance criteria for the task; task directions; available tools, materials, time, and space; and rules of operation within the task setting.

3) Activity of the student during learning. This encompasses how the student interprets task directions; time spent on various parts of the learning process; actual responses to perceived success, failure, or feedback from peers or teacher; and persistence and commitment in working at the task.

4) Peer or teacher activity during learning. This encompasses assessing and understanding the current knowledge and experience of the learner; celebrating what the learner does do and can do; matching instruction to expected performance; and gradually transferring responsibility for learning to the student.

The above framework was fleshed out and particularized through scanning responses to open-ended questions and student interviews in previous studies of our own and others of distance education in the current context. The information from these sources was categorized using the organizing framework. Space precludes presenting a detailed summary of what was learned from this source. A sample of student responses from previous questionnaires is presented here in the students' own words:

> Interaction with the instructor was the best thing about the course. It [interaction] is just up to the teacher. We got a brave student to ask questions. Don't know where we stand in class. [What was good is] she would send examples [of important problems] in the mail and put them up on the ... screen and go through and show us an example of how to do it. [Noise] kinda disturbs the chain of thought. Tapes are available if class is missed. When equipment breaks down time is lost. There are delays, but [the system] is soon in working order again. You learn self discipline.

Development and tryout of the pilot instrument

The earlier phases of development provided the framework, contextual, and substantive base for generating specific instrument design criteria, the specific form of the items, and the tryout.

Design criteria. There were five design criteria that evolved out of previous development. 1) The instrument will get at the "why of the outcomes". The four category framework that

taps sources of variability in student performance meets this criterion. 2) The content focus will be on issues, questions, and concerns that were highlighted in data from interviews and open-ended questions in local studies by ourselves and others in the same context. This meant centering content on: performance on tests and assignments, student learning, help from the instructor, student-teacher interaction, student commitment, and instructional effectiveness. 3) The content focus will be stated in both positive and negative form. This decision was based on the finding that the student's responsibility for his/her own performance loomed large in an intuitive analysis of previous work. Also it allowed positive and negative results to be juxtaposed to capture attention and help one to see the complexity of student judgments. Student concerns to be centered on were as follows:

Negative learning contexts: a) When you did not perform as well as you should have on tests and assignments. b) When it was difficult for you to learn in your class. c) When you did not get the help you wanted out of class.

Positive learning contexts: d) When your interaction with the instructor worked really well. e) When you did everything you should have to learn in your class. f) When instruction in the class helped you to learn.

4. The item format will be designed to tap student perceptions of how often each of the above six conditions of learning (a through f) were true for them and then to indicate which items in the

four categories of variables in the organizing framework seemed to account for the performance. 5. The items will yield information that can be portrayed in a form that contributes to understanding of the conditions contributing to student performance.

Item format for the instrument: Sample item

The following item structure is illustrative of the items in the student questionnaire. This is not an actual or complete item but an abbreviated form of an item to allow the reader to see whether or how the item format meets the design criteria.

Item X. How often do you feel that the INTERACTION between you and the instructor worked well?

1	2	3	4	5	6	7
almost always			about half the time			almost never

Now mark below ALL the reasons that explain why the interaction between you and the instructor sometimes worked really well. [Reasons representing the four categories of the framework discussed under "conceptualization" are then listed for students to "mark" those that apply to them.] Reasons follow the four categories presented earlier. Note that the first two categories attribute responsibility to oneself (inner) and the second two categories attribute responsibility to conditions external to oneself (outer). Illustrative reasons that fit the four categories are presented here:

Reasons related to the category of "Background knowledge, experience, and motivation" included:

___ I am very good at class discussion.

___ I didn't have the background to learn the subject.

Reasons related to the category of "Activity of student during learning" included:

___ I asked questions that were important to me.

___ I prepared for class discussion.

Reasons related to the category of "Peer or teacher activity" included:

___ The instructor waited until I finished my comment or question.

___ The instruction moved too fast.

Reasons related to the category of "The learning task, tools, and environment" included:

___ Distractions in the room made it hard to pay attention.

___ There was plenty of opportunity to participate.

Actual item construction in the pilot instrument followed this format and content without regard to sampling equally over all four categories, but making sure that all categories were represented in sufficient quantity to allow a tryout of the format.

Preliminary Tryout Findings

One tryout was designed simply to check for clarity and comprehensibility of the instrument in its current form. Some minor changes in the instrument were made based on a convenience

sample of 29 students from several different courses. A second tryout was conducted in four distance learning classes: a physics class, an art appreciation class, a history class, and a humanities course. The purpose of these tryouts was not to evaluate the courses but to get information that might contribute to further development of the instrument and get some preliminary insights into issues relevant to use of the information obtained. Though the return from the mailings was low (averaging 33%) due to a lack of budget for having a trained administrator at each site instead of using mailings, it was sufficient for purposes of testing the usefulness of the instrument.

Understanding an individual student.

A questionnaire can yield only a provocative starting point for understanding a student's performance. The current questionnaire appears to yield some data for such an exploration. Consider the responses of one student.

He judged himself as superior in typical academic performance and potential. However, he felt that he learned, "less than a reasonable amount" (3 on a 7 point scale) in this class. He felt that he had difficulty on tests in this class "almost always". He did report that he "didn't study enough". But he also noted that he "didn't have time to prepare well" and "the questions or directions were not clear". Thus he attributed his poor test performance in part to his "not studying" but this was moderated by noting external conditions that played the major part in his shortfall of performance.

This student also judged it very difficult to learn in this class. His rating was one point removed from "almost always" on a seven point scale. The reasons he gave for why it was sometimes difficult to learn from this television class were: "I couldn't get to talk with the instructor out of class". "My questions or comments were not responded to well"."There was little opportunity to ask questions". "Comments on oral or written performance came too late". For the most part it was the teacher or the task that was at fault in accounting for his poor performance. Even when asked to give reasons why interaction with the teacher sometimes worked well, it was because he himself, "asked questions that were important to him". No teacher behaviors or task conditions were noted. When "instruction helped me learn" (which was about half the time) it was because of his background experience and because he "studied and prepared out of class". In negative circumstances, when he "didn't get help outside of class", it wasn't because of his own neglect, but because there was no electronic mail, fax, or communication system easily accessible for him. Naturally we could juxtapose students with very different patterns of response in the same class for the instructor to ponder the differences. What is important is that the instrument yields information on the student's perception of conditions that led to his/her negative or positive instances of learning. This is useful information for the instructor who after all has the responsibility even for a student responding so as to attribute

shortfalls in his/her accomplishments to himself or herself. In our formal evaluation reports we juxtapose profiles of this kind of student with those of students responding with the judgment that they are themselves at fault rather than the instructor or the task conditions. Such a juxtaposition might capture attention of the instructor or course developers as well as illuminate the complexity of learners and the context of learning.

Understanding responses from a sample of students in the class.

Only a brief portion of the results is provided here since the purpose is to give the flavor of what can be learned with one particular instrument rather than to provide course evaluations.

Every course is different by virtue of its subject matter, tools, class size, difficulty, student background, instructional style, resources to assist the teacher as course developer, and so on. However, in presenting the kinds of findings that can be obtained for "a class" using the instrument described, we will briefly discuss one class (Physics). We have used the instrument with several other courses including Art Appreciation, History, and Humanities.

Physics was a lecture course with two off campus sites and one on campus site. The course was taped on campus in the fall and then rebroadcast in winter to different sites. Teaching assistants were used extensively before and after class for boardwork problem solving. Communication between students and teaching assistants was in person during the half-hour before and after the broadcast time. A large number of students utilized,

via telephone, the available office hours. The instructor used the chalkboard extensively.

Most of the respondents (73%) felt they learned a "reasonable amount" or more in this class, but 57% felt that they would have learned more face-to-face with the same instructor. No students gave reasons for sometimes preferring a televised course. However, the following reasons were given for preferring face-to-face instruction: personal contact, immediate interaction, the usefulness of instructor gestures for communication, just plain, "I like it", the difficulty of maintaining attention in a televised class, and the impersonal nature of the class. So these students leaned strongly toward preferring live instruction. Was this a function of the course? Across all three courses in the tryout 62% preferred face-to-face instruction and 54% would rather wait for a class to be taught in a regular classroom rather than "take it now" as a televised course. That was not an option for all students.

Fifty-four percent of the Physics students felt that they did not perform as well as they should have more than half the time. This is a high percentage. Only two reasons for this judgment were noted by 25% or more of the students: "I got very anxious during the tests or while doing the assignments" (35%). "The instruction did not prepare me for the tests or assignments" (27%). Written in comments split in the same way, some attributing their poor performance to their own lack of effort and others to task and instruction sources. It could be that

background experience made the difference. In related case studies on this course it was found that the major background variable accounting for performance on problem oriented tasks in this particular course is the amount of previous coursework in mathematics. Reasons given for not performing as well as they should have were: the instruction moved too fast (42%) and the visuals were not clear (62%). What exactly was not clear? The "...camera angle of the blackboard" made it difficult to see the writing and "the camera did not stay on it long enough". [Incidentally, as a result of feedback on this course "lecture notes" were made available so students did not have to copy them.

When giving explanations of shortfalls in this course or in their own performance, the general tone of students was one of something wrong with the instruction or task rather than the student's own study habits or effort. But, when it comes to giving reasons for what worked well, it was typically things the students themselves did that the students mentioned. When did interaction with the instructor work well? When, "I prepared for class discussion" (35%). When, "I asked questions that were important to me" (26%).

Just how important the student's own effort was is shown in the reasons given to support the judgment that students sometimes did everything they should to learn from this class. Some of these reasons follow:

1) The instructor made it possible by explaining things clearly and I listened and responded (35%).

2) I felt that the content was important to learn (85%).

3) The subject matter was interesting to me (69%).

4) I studied and prepared as needed for the class (50%).

5) I wanted to learn rather than goof off (73%).

6) I made sure I got to review videotapes or notes when I missed a class or needed a review (38%).

7) I made sure that I understood the goals and objectives of the lessons (54%).

8) I asked questions when I needed to (35%).

9) I focused my attention on the instruction even when there were distractions (42%).

10) I adapted to the situation when there were equipment or system breakdowns (42%).

11) I tried hard to learn in the new ways needed with this kind of instruction (televised) (46%).

12) I was interested ... and motivated to learn (42%).

13) I studied and prepared outside of class (65%).

14) The content and examples were within my background of experience (54%).

The picture one gets of this class is that the instructor is knowledgeable (65%) and a little less one who "cared a lot about his subject (46%). But for the instructor's knowledge to make a bigger difference in student performance, students have to study a great deal, have a background appropriate to the class, be able to see the instructor's chalkboard writing (this was made less important when the instructor later made his lecture notes

available in response to student feedback), ignore distractions, adapt to system breakdowns, take advantage of the videotapes available for review, and interact with the TA (and be prepared to do so) if you can't get interaction with the instructor (because of less access or not being prepared to ask questions).

The richness of data from the questionnaire has been illustrated above but a full depiction of what was learned is beyond the scope of the present paper. The intent was to show that the item format of calling for an evaluative judgment from the student, having the student give reasons for the judgment (checking them off as well as written in), and providing alternatives for judgments on negative as well as positive learning contexts, made possible the complex understandings illustrated here.

Issues to Guide the Design of Instructionally-Appropriate Evaluation

The purpose of this report was primarily to show how an instrument was developed, the kind of information it provides, and the issues one might draw from what was learned in the current study. This final section moves to three issues that are relevant to the design of instructionally appropriate evaluation: effectiveness/quality, commitment/stakeholders, access/resources.

Effectiveness/Quality

In study after study, it has been concluded that instruction via technology is just as effective as conventional instruction. This is not to say that differences do not exist. The stability

of this finding suggests that instruction via technology can be as effective as face-to-face instruction when properly used. The brief report presented here supports that contention. There were no mysteries as to what made a difference in how the Physics course worked for the students. But the evidence and conclusions drawn from this work and previous work shifts the emphasis away from comparative studies and toward the study of how technology can be used effectively in a given situation. Clearly quality instruction requires time, effort, resources, and a supportive environment not only in initial production but also in updating, maintenance, and adapting to different cultural and background needs of different audiences.

The key finding of the present study and previous work relevant to the quality and effectiveness issue is that what counts for effective instruction is highly variable from course to course and context to context. This is problematic for an organization trying to maintain quality control through some standardized centralized efforts.

Consider all the variables that a made a difference in student judgments of the Physics course. The course was a difficult, fast paced, lecture class with much writing on the chalkboard, which was often not easy to see because of the camera angle, quick scan, and focus on the instructor. The course emphasized formulas and solving problems. What would make this instruction work better, based on our study, is being clear about prerequisite knowledge for the course (mathematics through

calculus was essential) or adapting instruction to those admitted, being clear about the purpose of the course (is it a foundations course or one to sort students out of certain science or engineering programs), providing photocopied class notes for purchase by students so that they can focus on what the instructor is saying and be better able to ask questions (this was done), providing regular feedback during the course, and providing TA support consistently like the best these students experienced. But the variables that make a difference take different forms for different course. For example the Arts course we assessed was slow paced and "easy" in that it dealt with very few difficult discriminations about pieces of art.

The key issue that emerges from this study and others is that what would make the instruction more effective and of higher quality in different courses is developing a "policy for the unpredictable" (Glass, 1979). The weather is unpredictable. But we know the variables. Thus, what we do is monitor the known variables on a periodic basis, make adaptations in our plans as needed, and "carry an umbrella" for when the prediction goes awry or monitoring data is not available. In addition, microstudies of critical components of the course would be valuable. For the Physics course focus on student preparation, motivation, use of notes, listening to the instructor with notes in hand, and asking questions.

Commitment/Stakeholders.

As the role of instruction and training is expanded to meet the needs of rapidly changing demands in the work force, successful implementation of instruction is dependent on the commitment of policy makers, administrators, production personnel, teachers, and students. The need for incentives, benefits, training, and resources for all those involved is essential. Yet there are always trade-offs that differentially affect stakeholders. A stakeholder is a member of a group affected by an instructional program and the evaluations of a program. Thus, students, instructor, production staff, funding agencies, policy makers, and evaluators are all stakeholders. So what are the issues that

The key finding that arises from the present study and other studies related to the "commitment/stakeholder" is that all stakeholders had a part in the success of the course as well as in the consequences of the degree of success. Production quality was poor in some respects (production staff and funding agencies have responsibilities here), students sometimes did not put forth the necessary effort nor give feedback on production and instruction that could have made a difference (until this study), and instruction itself though conducted by a well informed teacher was not responsive to student needs.

The key issues here have to do with costs and complexity. Given limited resources it is difficult to involve all stakeholders on a continuous basis to gather information relevant

to course improvement and to act on it. Furthermore, the complexity of involvement is increased due to the tendency of different stakeholders to use available information to serve their own needs and wants rather than the needs of all those affected by a course or program. The direction for solutions to the problems of stakeholder involvement are in three elements of process. First, checks and balances might be set up to ward off solely self serving use of information. Second, contractual agreements might be set up so that different parties have appropriate rights and responsibilities, understand them, agree to penalties for not living up to contractual agreements, and have a way to seek redress if they are overlooked. Third, two or three small evaluations from different perspectives (rather than one large one) would probably get more responsiveness to all stakeholders.

Access/Resources

The evidence of current research supports the conclusion that the use of educational technology can expand educational opportunity. This is especially true in situations where access to instruction is limited by distance, social situations, and physical handicaps. Thus the success of the use of technology will be greatest in those settings where there is a need to extend educational opportunities to those who have not been served by institutions as they now operate. But access involves both "getting the service" and " being able to make use of the service". In either case resources are a major consideration.

Consider some key findings of the present study both reported above and in the broader study for one dimension of access/resources. For the Physics course, 42% of the students indicated that they would rather take a televised course now than wait for face-to-face instruction. For other courses assessed and not discussed in the present report the percentages ranged from 30% to 62%. The highest percentage of students preferring to take a televised class now rather than wait for face-to-face instruction was for a humanities course with high production costs (and production quality and value) and with visual information that could not easily or best be presented in a straight lecture format. The lowest percentage of students preferring to take a televised course now rather than wait for face-to-face instruction (30%) was for the arts course. The point is that access to televised instruction is preferred differentially in different classes.

More important, the reasons for this differential preference are highly specific to context. Furthermore, if the concept of access is broadened to include not only "getting the course" but effectively "making use of the course", other variables that make a difference in access (getting the course and making good use of it) surface such as: instructional materials, student study habits, student motivation, student anxiety, video quality, standards for assessing student performance, availability of videotapes of class sessions for review, availability of peers for interaction, site managements for distractions and other

environmental conditions, and matching tests and instructional goals and activities.

The key issue here is that access is complex and specific to a given context. But in any case, the issue of access has as much to do with the nature and range of the delivery system as well as its reception (both technologically and in terms of student motivation and success in comprehension and use of information transmitted). Future resources may well be influenced by attitudes students and faculty take away from the experience when they play the role of taxpayers and actors in the political system.

Epilogue

The development and tryout of an instrument has been briefly summarized in this report. The intent was to end up with issues which have been sketched out above. Issues are not prescriptions, they are concerns to be taken into account. They must be dealt with at all stages in the development and delivery of televised instruction -- course selection, decisions as to level of support, development, tryout, maintenance, and institutionalization.

If there is one theme that runs through all our discussion and findings it is that evaluation design must be grounded in diversity of understandings and stakeholder concerns. The consensus must encompass diversity. Lindblom (1987) centers on this issue in his discussion of "Who needs what social research for policymaking?" He concludes that, "The existence of social

agreement on many complex issues on which free minds would be expected to disagree is itself sufficient evidence that the minds of ordinary citizens are greatly impaired and ... the impairment, of course, afflicts our ... leaders as well as the whole citizenry .... What is required to right it is ... analysis that constitutes an education and an enlightenment ... for leader and citizen alike" (p.177). It is that kind of evaluation outcome that we wish to move toward.

Notes

1. Because communication involves interaction among individuals, it is important to examine the ways individuals, in relation to one another, accommodate new communication technolgies into their everyday lives. The concept of accommodation (Anderson & Meyer, 1989) keeps intact the interplay of face-to-face communication with mediated communication, and undergirds the focus and illumination of the contexts of instruction. In the words of Anderson & Meyer:

> The effects of media occur when their content is entered into the interpretive strategies that we use and the social action in which we participate. These effects are therefore, embedded in and not separable from the scenes of life in which we play. These scenes are not themselves the consequences of media, but are the ecological expression of human individuals socially embedded in their cultural environment (pp. 44, 45).

For alternative conceptualizations on the merging of mass and interpersonal communication, see Gumpert & Cathcart (1986) and Hawkins, Wiemann, & Pingree (1988).

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